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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

11/24/97
JCAUS U.S. PTU

Attorney Docket No.: GLP006/JTN

Anticipated Classification of this Application:

Class 53 Sub Class 557

Prior Application: S.N. 08/638,160

The Commissioner of Patents
& Trademarks
Washington, D.C.
U.S.A. 20231

Dear Sir:

This is a request for filing a

- ☒ Continuation application
☐ Divisional application

under 37 CFR 1.60, of pending prior application Serial No. 08/638,160 filed on April 26, 1996 of William J. Bakker and N.A. Williams for a "Device for Heat Shrinking Film Onto An Open-Topped Container", which is a continuation application of Serial No. 08/089,462 filed on July 12, 1993, which is a continuation application of Serial No. 07/873,844 filed April 27, 1992.

1. ☒ Enclosed is a copy of the prior application including the oath or declaration as originally filed and an affidavit or declaration verifying it is a true copy.
2. ☒ Enclosed is a copy of the prior application as filed.
- 3 a). ☒ The filing fee is calculated below:

	Number Filed		Number Extra	Rate	Total
Total Claims	20	- 20 =	0	X \$11	=
Independent Claims	3	- 3 =		X \$37	=
Multiple Dependencies	No			Flat Rate	=
Base Fee					<u>\$395.00</u>
TOTAL FILING FEE					<u>\$395.00</u>

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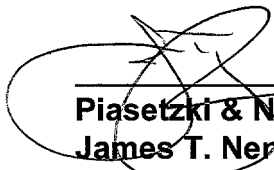
- 3 b). ☒ Small Entity Status. We respectfully request that this application be accorded small entity status pursuant to 37 CFR 1.27 for the purpose of paying fees, on the basis that a verified statement establishing small entity status has been filed in the parent application (37 CFR 1.60).
4. ☐ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Account No. _____. Three copies of this sheet are enclosed.
5. ☒ A cheque in the amount of \$ 395.00 is enclosed.
6. ☒ Cancel in this application original claims 10 to 20, 24, 25, 27 to 35 of the prior application before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)
7. ☒ Amend the specification by inserting before the first line the sentence: - This is a continuation of application Serial No. 08/638,160 filed April 26, 1996 which is a a continuation of application Serial No. 08/089,462 filed July 12, 1993 which is a continuation of Serial No. 07/873,844 filed April 27, 1992.-
8. ☐ Transfer the drawings from the prior application to this application and abandon said prior application as of the filing date accorded this application. A duplicate copy of this sheet is enclosed for filing in the prior application file (May only be used if signed by person authorized by Rule 138 and before payment of base issue fee.).
- 8 a). ☐ New formal drawings are enclosed.
- 8 b). ☐ Priority of application Serial no. _____ filed _____ in _____ is claimed under 35 U.S.C. 199.
9. ☐ The prior application is assigned of record to _____.
10. ☒ The power of attorney in the prior application is
- | | |
|-----------------------|--------|
| James T. Nenniger | 32,670 |
| Gregory A. Piassetzki | 37,056 |
- 10 a). ☐ The power appears in the original papers in the prior application.

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- 10 b). [x] Since the power does not appear in the original papers, a copy of the power in the prior application is enclosed.
- 10 c). [x] Address all future communications to James T. Nenniger or Gregory A. Piasetzki at Piasetzki & Nenniger, 120 Adelaide Street West, Suite 2308, Toronto, Ontario, Canada, MAH 1T1, Telephone (416) 955-0050.
11. [x] A preliminary amendment is enclosed. (Claims added by this amendment have been properly numbered consecutively, beginning with the number next following the highest numbered original claims in this prior application.)
12. [x] I hereby verify that the attached papers are a true copy of prior application Serial No. 08/089,462 as originally filed on July 12, 1993 and that no amendments referred to in the oath or declaration filed to complete the prior application introduced new matter.

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statements may jeopardize the validity of the application or any patent issuing thereon.

November 21, 1997
Date



Piasetzki & Nenniger
James T. Nenniger
Registration No. 32,670

JTN/JW

Attorney of Record

08/089,462

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**Certified by the Law Society of Upper Canada as a Specialist in
Intellectual Property Law (Patents, Trademarks & Copyrights)*

Serial No.: (to be assigned)
(Continuation of 08/638,160)
Applicant: **BAKKER, W.**
Title: **DEVICE FOR HEAT
SHRINKING FILM ONTO AN OPEN-
TOPPED CONTAINER**
Filed: Concurrently with Continuation
Application
Examiner: (to be assigned)
Reference: **GLP007/JTN**
Date: **November 21, 1997**

PRELIMINARY AMENDMENT UNDER 37 C.F.R. 1.115

The Commissioner of Patents
& Trademarks
Washington, D.C.
20231 U.S.A.

Dear Sir:

The Applicant submits this Preliminary Amendment under 37 C.F.R. 1.115 for the continuation application filed herewith.

IN THE CLAIMS

Please add the following claims to the continuation application. The claims have been numbered consecutively beginning with claim 36, which is the next number following the highest numbered original claim in the prior filed application.

36. **A cover for sealing an open-topped container comprising:
a piece of heat shrinkable film shaped and sized to cover the open**

top of said container and to have a downwardly extending portion around an upper rim of said container, wherein said downwardly extending portion includes a first means to absorb radiant energy, to transfer heat to said downwardly extending portion upon said first means being exposed to a radiant energy source wherein said downwardly extending portion is heat shrunk onto said container to form a spill resistant cover upon exposure to a radiant energy source.

37. The cover of claim 36 wherein said first means comprises adapting said thin film to absorb energy.
38. The cover of claim 36 wherein said first means comprises said film having tint, said tinting being adapted to absorb radiant energy.
39. The cover of claim 36 wherein said first means comprises a coating on said film said coating being adapted to absorb radiant energy.
40. The cover of claim 39 wherein said radiant energy absorbent coating is printed into said film.
41. A roll of heat shrinkable film for use in a device for forming spill resistant covers on open-topped containers, said roll comprising:
a plurality of severable pieces of heat shrinkable film formed in a continuous film, each piece being shaped and sized to cover the open top of said container and to have a downwardly extending portion around an upper rim of said container wherein said downwardly extending portion includes a first means to absorb radiant energy to transfer heat to said downwardly extending portion upon said first means being exposed to a

42. The cover of claim 40 wherein said radiant energy is infrared radiation and said radiant energy absorbing coating is an ink.

It is respectfully submitted that the above addition of claims 36 to 42 are directed to matters shown and described in the prior application and do not add any new matter not previously described.

Respectfully submitted,

Bv3

James T. Nenniger
Reg. # 32,670

JTN/jw
PREMEND DOC

BP File No. 6794-001

BERESKIN & PARR

UNITED STATES

Title: Device for Heat Shrinking Film
Onto an Open-Topped Container

Inventor(s): William J. Bakker
N. A. Williams

- 1 -

**Title: Device for Heat Shrinking Film
Onto an Open-Topped Container**

FIELD OF THE INVENTION:

5 This invention relates to a device which may be used to seal food into open-topped containers. In particular, this invention relates to a device suitable for heat shrinking film onto such open-topped containers to seal food or drink inside the container.

10 **BACKGROUND OF THE INVENTION:**

Presently in the fast food drink industry it is typical to serve a drink in a paper, plastic or other disposable cup topped with a preformed plastic lid. The plastic lid fits tightly over the lip formed at the top
15 of, for example, a paper drink cup, and may include apertures to permit straws or openings to be formed in the lid to directly drink the contents of the cup.

Unfortunately, there are many problems associated with the use of these plastic lids. For
20 example, the lids are generally expensive. Further, the lids are bulky and create problems in storage and in disposal. Further, the seal formed by the lids is dependant upon the lid being placed on properly, and can leak if not properly placed. Finally, the handling of the
25 lid is not completely hygienic.

In order to overcome these problems, various devices and methods have been proposed in which a cover is placed on an open-topped container and then heated to shrink it into sealing engagement with the top of such a
30 container. Examples of such devices can be found in the following United States patents: U.S. Patent Nos. 3,260,775; 3,354,604; 3,460,317 3,491,510; 3,494,098; 3,507,093; 3,621,637; 3,877,200; 3,838,550; 3,916,602; 4,035,987; 4,184,310 and 4,562,688. While the solutions

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proposed by these prior devices and methods are interesting, they fail to provide a sufficiently cost efficient, easy and inexpensive alternative to preformed rigid plastic lids. As a consequence, rigid plastic lids remain in widespread use. Some of the main failings of these prior devices are that they are bulky, noisy, unresponsive, and expensive. Heating systems comprising blowing air over a hot element and then onto a film require large amounts of unnecessary heat, even when in standby mode, which makes temperature control very difficult. Further, continuous elevated temperatures are expensive to maintain and may be deleterious to the immediate environment.

SUMMARY OF THE INVENTION

Aside from the benefits of increased hygiene and reduced waste, the present invention is directed to providing a practical device which has commercial utility. One aspect of the present device is to provide an energy efficient way of sealing open-topped containers which avoids any substantial build-up of heat. An intermittent source of radiant energy is used, and energy is directed onto an energy absorber located at the specific place where heat is required. Thus, heat is originated where it is needed, when it is needed and a cooler, quieter, safer and more efficient device results.

The present invention provides a device for heat shrinking a cover onto an open-topped container, said device comprising:

- a housing adapted to receive said container; and
- having a strip of heat shrinkable thin film;
 - a cutting means positioned against said thin film for cutting said thin film upon said thin film being urged onto said cutting means by said container;
 - a hood for holding a cut piece of said film in

9;

Figure 11 is a schematic sketch of an electronic control circuit for the present invention;

Figure 12 is an alternate embodiment of a micro-switch system according to the present invention;

Figure 13a is a view along lines 13-13 of Figure 12 in a first position; and

Figure 13b is a view along lines 13-13 of Figure 12 in a second position.

10 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Figure 1 shows a device 10 for heat shrinking a thin film onto an open-topped container 12. The housing 10 includes an opening 14 of sufficient size to allow placement of the container 12 within the housing 10. In the embodiment of Figure 1, placement of the container 12 within the opening 14 is accomplished manually, illustrated by a hand 16.

Turning to Figure 5, there is shown a cross-sectional schematic view of the operational components of the device 10 of Figure 1. The container 12 is shown in the opening 14. The opening 14 is defined by side walls 18 and 20 of the device 10. Shown on the right-hand side is a roll of thin plastic film 22 on an axle 24. The film 26 passes over a roller 28 across the top of the container 12 across a second roller 30 and onto a take-up axle 32. Shown at 34 is a rewind motor. It will be appreciated that the rewind motor 34 can rotate the pick-up axle 32 in the direction of arrow 36 which will advance the film 26 across the top of the container 12 and cause the roll of film 22 to rotate in the direction of arrow 38. Alternatively, the advancing of the film 26 could be accomplished manually by turning a lever or knob mounted on take-up axle 32.

The film 26 is preferably a bi-axially oriented shrink film having a preferred thickness of between 60 to 100 gauge. Good results have been achieved with a 75 gauge polyvinyl chloride film purchased from Reynolds

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Metals Company at Richmond, Virginia. Other films, such as copolymers, polyolefins and the like may also be appropriate. The film, to be most useful, must be foodgrade contact-approved by the appropriate regulatory authorities. A 7½" outer diameter roll of 75 gauge shrink film, which includes a 3" diameter fibre core, will yield approximately 8,000 covers according to the present invention.

In Figure 5, the container 12 is located in a locator identified generally at 40. The locator 40 is shown in more detail in Figures 7 and 8. Turning to Figure 7, there is shown a plate 42 having a pair opposed guides 44 and 46. The plate 42 also has an opening 48 located between the guides 44, 46. The guides 44 and 46 are substantially identical and therefore the following discussion in respect of guide 44 applies equally to guide 46.

The guide 44 comprises a rub rail 50 which contacts an outer edge of a container 12. Extending from plate 42 are two posts in respect of each guide 44, 46. In respect of guide 44 there is a stop post 52 and a guide post 54. A slot 56 is formed in the guide 44 and a spring 58 is housed between the guide post 54 and the end of the slot 56. A pin 59 may be used to secure one end of the spring 58. A washer 60 is used to retain the other end of the spring 58 within the slot 56. The washer 60 is placed around the guide post 54. Between the free end 55 of guide post 54 and the washer 60 is a further spring 61. The spring 61 allows the guide plate 44 to articulate away from the plate 42 to facilitate removal of the container 12 from the device 10.

It will now be appreciated that the guide 44 can move laterally in the direction of double ended arrow 62 guided by means of the stop 52 and the guide post 54 with the slot 56. It will also be appreciated that the curved portion 64 of the rub rail 50 will provide an indication to anyone inserting a container 12 into the locator that

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the container is appropriately located. Appropriately in this sense means centered under the plate opening 48.

Turning to Figure 8, the locator 40 of Figure 7 is shown in cross-sectional view. As can be seen, the guides 44 and 46 are positioned on adjacent side edges of a container 12. The plate opening 48 is shown together with the plate 42. The thin film 26 is also shown stretched across the top 13 of the container 12.

It can now be appreciated that the container 12 can be moved in the direction of double ended arrow 64 into position beneath plate opening 48. During this period, the guides 44 and 46 will gradually open and then close about the periphery of the container 12. Thereafter, as shown in Figure 8, the container 12 is free to be moved in the direction of double ended arrows 66 as will be discussed below. It will be appreciated that containers 12 of varying diameter can thus be accommodated by the instant invention, since all containers will be centered by the locator beneath the plate opening 48. This is desirable in a food services environment where cup size selections typically include small, medium and large.

Turning now to Figure 5, a container 12 is shown centered in locator 40. A first radiant energy source 68 and a second radiant heater 70 can now be explained. Located above the centered and located container 12 is a top shrink hood 72. The second radiant heater 70 is located within the top shrink hood 72. The top shrink hood 72 includes a glass shield 74 and a heat transfer means 76. In some circumstances the glass shield 74 may not be required, however, to prevent the possibility of splashes reaching the second radiant energy source 70, it is preferred. It may not be necessary to use glass. Plastic or other transparent substances may be appropriate. Good results have been achieved when the heat transfer means 76 is made from a screen aluminum material painted a dark colour, such as black. The dark aluminum heats and cools quickly which is desirable in the

circumstances.

A pierce tool 78 is also shown extending outwardly from the heat transfer means 76. The purpose of the pierce tool 78 is to make a vent opening in the thin film to allow gases such as carbon dioxide from a soft drink to escape the container.

An alternative to pierce tool 78 is to form small opaque portions 79 in the shrink film. These opaque portions or "dots" will cause a hot point which may perforate the film as more fully explained below. If desired the hot points can be made in a specified pattern to form a sipping opening or the like, as shown in Figure 2A. Also shown in Figure 2 is a straw 122 with a pointed end 124 for piercing the film, shown in place as 126. A fluid, such as a soft drink is shown at 128.

Also shown in Figure 5 is a drive belt 80 which connects a pulley 82 with a motor. Attached to the pulley 82 are a pair of arms 84. The arms 84 rotate when the pulley 82 is rotated by the belt 80. Depending from the arms 84 about pivot points 86 are pivot arms 88. Pivot arms 88 include a roller 90 at one end and the first radiant energy source 68 at the other end. If preferred, a reflector may be provided such as 92 around the first radiant energy source 68.

Also show in Figure 5 is a knife or film cutting blade 94 to which is attached a heating element 96. The heated blade 94 ensures a quick clean cut of the thin film, upon the thin film contacting the blade 94. As can be seen from Figure 5, the blade 94 is below the top hood 72, so the film will be cut to shape just prior to or about the same time as the container 12 contacts the hood 72. Good results have been achieved when the blade is made from a two point center face steel cutting rule, and maintained at a temperature of between 275°F to 400°F. This format appears to limit smoke and fume generation.

The knife 94 may be circular in shape, or may be as shown in Figures 9 and 10. It will be noted that the

knife 94 in Figures 9 and 10 includes a rounded oblong section 95. This will result in a similarly shaped section being formed in a cut piece of film, as described below, which can be used as a convenient pull tab for removing a cover which has been shrunk onto a container 12. In the preferred embodiment the thin film 26 has a width greater than the width of the knife 94 so that a trim 27 (see Figure 5) is left after the cut is made, and the trim 27 is strong enough to allow the film 26 to be advanced by a tensile force without tearing.

Turning now to Figure 6, the operation of an instant device can now be understood. In Figure 6 the container 12 has been raised in the direction of arrow 100. This has had the effect of pushing the film 26 upwardly into engagement with the knife heated film cutter blade 94. This has caused a cut portion of the film shown as 102 to be draped across the top 13 of the container 12. At this point the hood 72 is holding the cut piece of film 102 generally in place. As the container 12 is raised further, the hood 72 is also raised. Rollers 90 then contact a ledge 104 formed on the outer surface of the hood 72. Further upward movement causes the movement of the first radiant energy source 68 about the pivot point 86 until the first radiant energy source 68 is closely adjacent to a draped over edge of cut portion 102 shown as 103. Contact is then made at a limit switch, as explained below in respect of Figure 11, which energizes a motor 99 (shown in Figure 4). Upon energization of the motor 99, the belt 80 revolves causing the rotating arms 84 to revolve rotating the first radiant energy source 68 about the periphery of the top of the container 13. Simultaneously with the energization of the motor 99 and the rotation of the first radiant energy source 68, the first radiant energy source 68 is energized to cause radiant energy to be directed towards the dangling edge 103 of the cut portion 102 of the said film 26.

It will be appreciated that the preferred

invention causes the first radiant energy source 68 to move into position closely adjacent the downward edge 103 of the cut portion 102. Such movement is preferred because radiant energy obeys the inverse squared rule in which the amount of energy is proportional to an inverse of the square of the distance from the source. By locating the first radiant energy source 68 close prior to being energized, more energy can be usefully used and focused away, for example, from an operator's hands. Also, by the pivoting action, the operator's hands are kept clear of the energy source 68, until the container 12 is in position.

After a predetermined length of time, the first radiant energy source 68 is de-energized and the second radiant energy source 70 is energized by a timer 120. The second radiant energy source 70 energy is directed through the glass shield 74 onto an energy absorbing body 76. This transfer of heat causes a shrinking of the top portion across container 12 of the cut portion 102. Thereafter, the sealed container 12 can be lowered and removed from the apparatus.

A preferred type of energy absorbing body 76 is a darkened aluminum screen. The body 76 is placed very closely adjacent the top portion of the cut section 102 and may be in contact therewith. The darkened screen or body 76 absorbs energy and transfers it onto the top portion. It will be appreciated that aluminum is a suitable material because it will cool rapidly, when the energy source 70 is shut off, thereby preventing premature shrinkage of a top portion on a subsequent container upon being first introduced into the hood 20.

It has been found that the preferred radiant energy sources are Tungsten Halogen Lamps. About 70% of the energy produced by these lamps is in the preferred wavelength range of the infrared (750 millimicrons and beyond).

These lamps are compact, durable, inexpensive

rod 202 is attached to shaft 200, and will rise and subside with the hood 72 being raised and lowered. Remote from shaft 200 there is a rack 204 connected to the rod 202 which interacts with a pinion 206, in a manner shown by double ended arrows 208. Also shown are a cam shaft 210 attached to eccentric cams 212.

Shown in Figures 13A and 13B are the means of closing electrical circuits upon rotation of the cam shaft 210 by the pinion 206. A secondary roller 214 is located on a pivot arm 216. When cam 212 is rotated in one direction an electrical spring clip 218 is forced into contact with an electrical contact 220 closing a circuit. Upon being rotated in an opposite direction, the cam 212 urges the pivot arm 216 up and out of the way, and does not close the circuit, as shown in Figure 13B.

It can now be appreciated that the present invention uses radiant energy from the radiant energy sources to effect shrinkage. Radiant energy is preferred, because it travels relatively unimpeded through transparent mediums such as air or transparent film. The preferred radiant energy source is a Tungsten-Halogen bulb, which is described in more detail above. The present invention has process parameters for heating which depend upon an absorbing means for the radiant energy, and in particular, how close any absorbing means conforms to a theoretically ideal "black body". An ideal "black body" completely absorbs all radiant energy that strikes it and thus is capable of radiating that same energy outward.

The way in which the present invention seals heat shrinkable thin film onto a container, is to employ a first means to transfer heat to the downwardly extending portion of the cut piece of thin film. In this sense, the first means can comprise adapting the thin film to absorb energy, interposing an absorbent body adjacent to thin film, or adapting the area of the container just below the rim to become energy absorbing. The thin film can be adapted to absorb energy by being made from a tinted

material, or by being coated with an energy absorbent coating, for example, printing. The ability of the opaque or coated film to absorb radiant energy will vary depending upon what type of tinting or coating is used.

5 A darker or more opaque film will absorb more energy.

An example of a preferred interposed absorbent body is a darkened aluminum screen 112, which moves closely adjacent the edge 103. The darkened portion of the screen will absorb energy and then radiate it, giving
10 rise to heat. The heat will be transferred to the air adjacent to the film, then to the film which will shrink the film.

The container may be adapted to absorb radiant energy, and thus produce heat in a preferred location, by
15 including a darkened band 15 in the area where heat generation is desired, such as just below the rim. For aesthetic reasons, black bands may not be acceptable, but other coloured bands will also work. With a cooler colour, the exposure to the radiant energy source may need
20 to be slightly longer. However, the length of time of exposure to the radiant energy source can be adjusted in the present invention through adjustments made to the timer T2. A gap 17 may be incorporated into the band 15 to permit the end user to lift the shrunken cover off the
25 container if so desired.

In some circumstances, it may be desirable to urge the film onto the cup. Therefore, the present invention also comprehends the use of a spring wire 110, which trails (or leads) the revolving first radiant heat
30 means 68, and urges the edge 103 into contact with the container 12 just below the top 13.

It will be appreciated by those skilled in the art that the foregoing description relates to a preferred embodiment and that various modifications can be made
35 without departing from the broad scope of the appended claims. Some of these modifications have been discussed above and others will be apparent to those skilled in the

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art.

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WE CLAIM:

1. A device for heat shrinking a cover onto an open-topped container, said device comprising:
 - a housing adapted to receive said container; and
 - 5 having a strip of heat shrinkable thin film;
 - a cutting means positioned adjacent said thin film for cutting said thin film upon said thin film being urged onto said cutting means by said container;
 - a hood for holding a cut piece of said film in
 - 10 place across said open top of said container, wherein said cut piece includes a portion extending from under said hood downwardly around an upper outer rim of said container;
 - a first radiant energy source for directing
 - 15 energy toward said downwardly extending portion of said cut piece of film;
 - a first means to absorb radiant energy to transfer heat to said downwardly extending portion of said cut piece of film; and
 - 20 a switch means for intermittently energizing said first radiant energy source whereby said downwardly extending portion of said cut piece of film is shrunk onto said rim;
2. A device as claimed in claim 1 further including
 - 25 a timer means for de-energizing said first radiant energy source after a predetermined time and for energizing a second radiant energy source located in said hood; said second radiant energy source directing energy onto a second means to absorb radiant energy, to transfer heat to
 - 30 the thin film across the top of the container;
 - whereby said cut piece of film is shrunk across the top of said container after being shrunk around the rim of said container to form a spill resistant cover.

3. A device as claimed in claim 1 wherein said first means to transfer heat to said downwardly extending portion of said cut piece of film comprises adapting said film to absorb at least some of said radiant energy.

5 4. A device as claimed in claim 3 wherein said film is adapted by being made at least partially opaque to said radiant energy, and upon being exposed to said radiant energy said opaque film heats up.

5. A device according to claim 4 wherein said thin
10 film is made at least partially opaque by being tinted.

6. A device according to claim 4 wherein said thin film is made at least partially opaque by being coated with an energy absorbing coating.

7. A device as claimed in claim 1 wherein said
15 first means to transfer heat to said downwardly extending portion of said cut piece of film comprises mounting an energy absorbent body adjacent to said thin film.

8. A device as claimed in claim 7 in which said energy absorbing body comprises a darkened aluminum
20 screen.

9. A device as claimed in claim 1 in combination with a container, and wherein said first means to transfer heat to said downwardly extending portion of said cut piece of film comprises adapting said container to absorb
25 said radiant energy adjacent said downwardly extending portion.

10. A device as claimed in claim 9 wherein said container is adapted by having an energy absorbent band located below an upper rim thereof.

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11. A device as claimed in claims 3, 7 or 9 wherein said housing includes a dispensing reel and a take-up reel for a continuous strip of said thin film.

12. A device according to claim 11 wherein said thin
5 film is a biaxial film of between 40 to 120 gauge thickness.

13. A device according to claim 12 wherein said thin film has a width greater than the width of said knife to form a trim after said cut portion is made, said trim
10 being sufficient to allow said film to be advanced by a tensile force in said trim without tearing.

14. A device according to claims 3, 7 or 9 further including a locator which comprises at least one guide plate.

15 15. A device according to claim 14 wherein said locator comprises an opposed pair of guide plates, at least one of which is spring loaded.

16. A device according to claim 14 wherein said locator comprises an opposed pair of spring loaded guide
20 plates having curved container contacting surfaces for centering the container.

17. A device according to claims 3, 7 or 9 wherein said knife means comprises a heated steel rule.

18. A device according to claim 17 wherein said
25 knife means defines a cut piece of thin film having a symmetrical overhang around all edges of said container.

19. A device according to claim 17 wherein said knife is heated by a resistance heater to a temperature of between 275°F and 400°F.

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20. A device according to claims 3, 7 or 9 wherein said hood covers said top film to prevent said top film from being directly exposed to energy from said first radiant energy source.

5 21. A device according to claim 2 wherein said second means to absorb radiant energy comprises means to render said film at least partially opaque to radiant energy from said second radiant energy means.

22. A device as claimed in claim 21 wherein said
10 thin film is tinted to absorb energy from said second radiant energy source.

23. A device as claimed in claim 21 wherein said thin film is printed to absorb energy from said second radiant energy source.

15 24. A device according to claim 2 wherein said second means to absorb radiant energy comprises a darkened aluminum screen.

25. A device according to claim 2 further including a piercing tool to make at least one hole in said cut
20 piece of thin film.

26. A device as claimed in claim 21 wherein said film includes a pattern of discrete opaque dots forming a predetermined pattern to cause perforations upon exposure to said second radiant energy means.

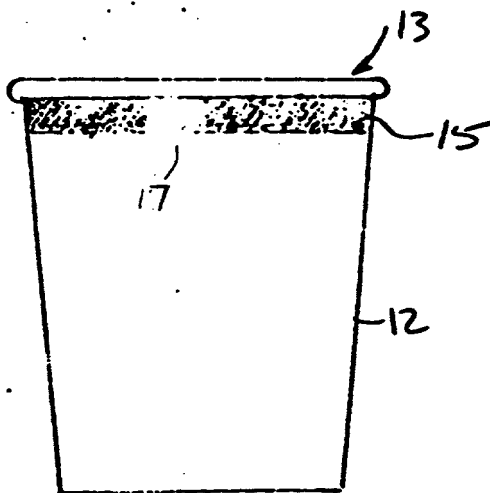
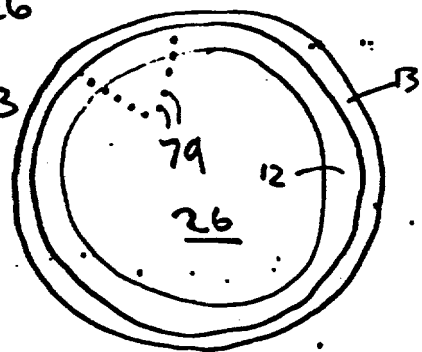
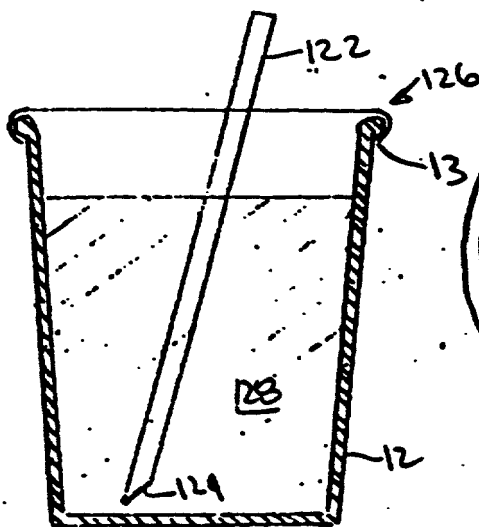
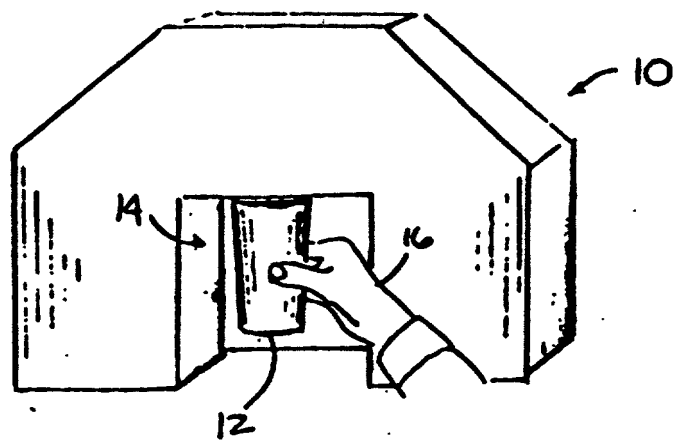
25 27. A device according to claim 1 further including a motor, a drive means connecting said motor to said first radiant energy source and wherein said switch means energizes said motor as well as said first radiant energy source, and said first radiant energy source is rotated
30 around said rim.

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ABSTRACT OF THE DISCLOSURE

A device for heat shrinking thin film onto open-topped containers to form spill-resistant covers is shown. A radiant energy source is intermittently energized in association with timers to direct radiant energy towards the thin film. An energy absorbing body is associated with the thin film to absorb energy and create heat adjacent to the film which in turn causes the thin film to shrink. The energy absorbing body can be the adaptation of the thin film to be opaque to the radiant energy by either being coated with an energy absorbing coating such as printing, or being made partially opaque by means of tinting. The container can also be adapted to absorb energy by including a darkened band adjacent the upper edge of the rim. The device can also interpose an energy absorbing body, such as a darkened aluminum screen adjacent to the film to be heated to cause the thin film to shrink. The device shrinks the thin film around the rim first, then shrinks the film across the top of the container to form a spill-resistant cover. In one embodiment, printed patterns on the film can be used to create perforations.

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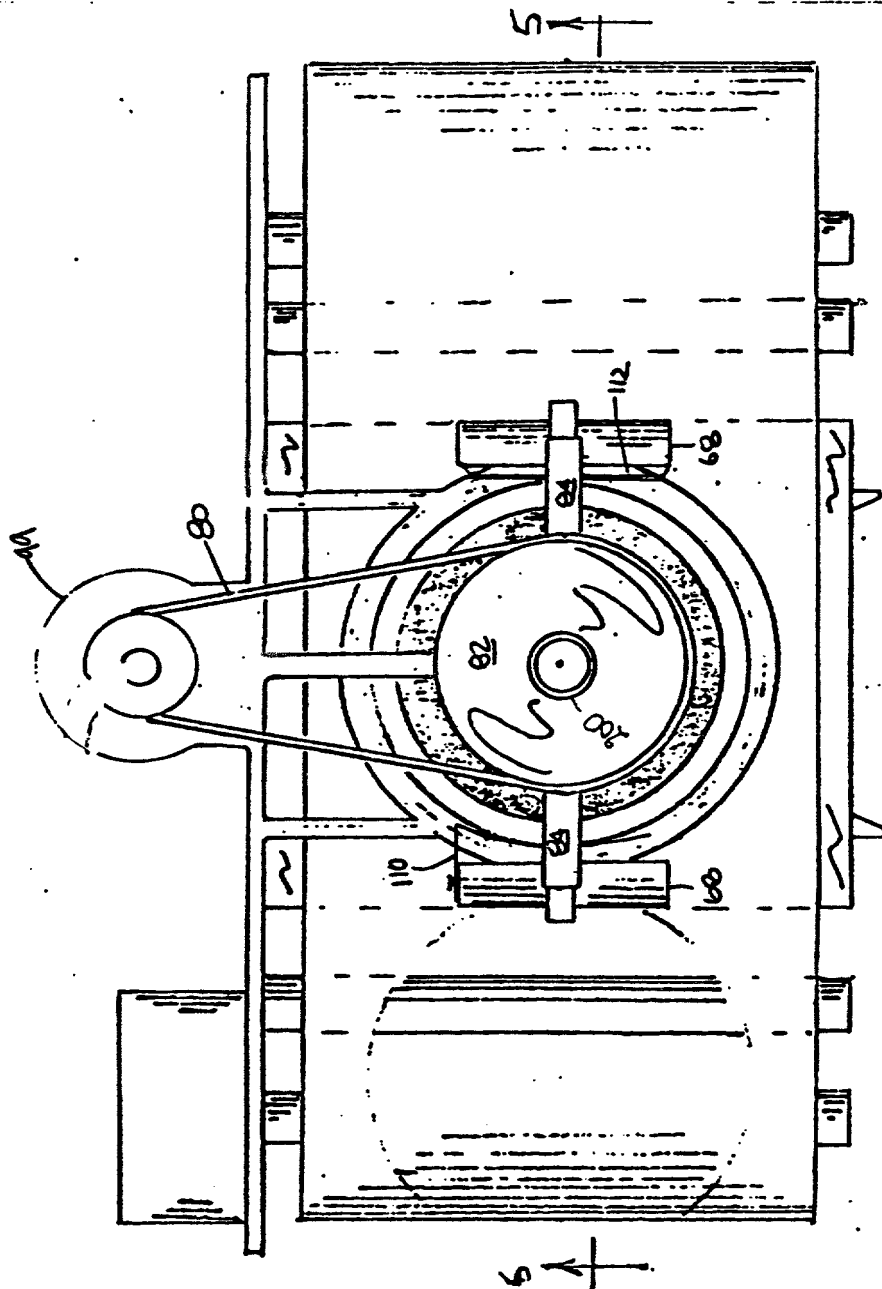
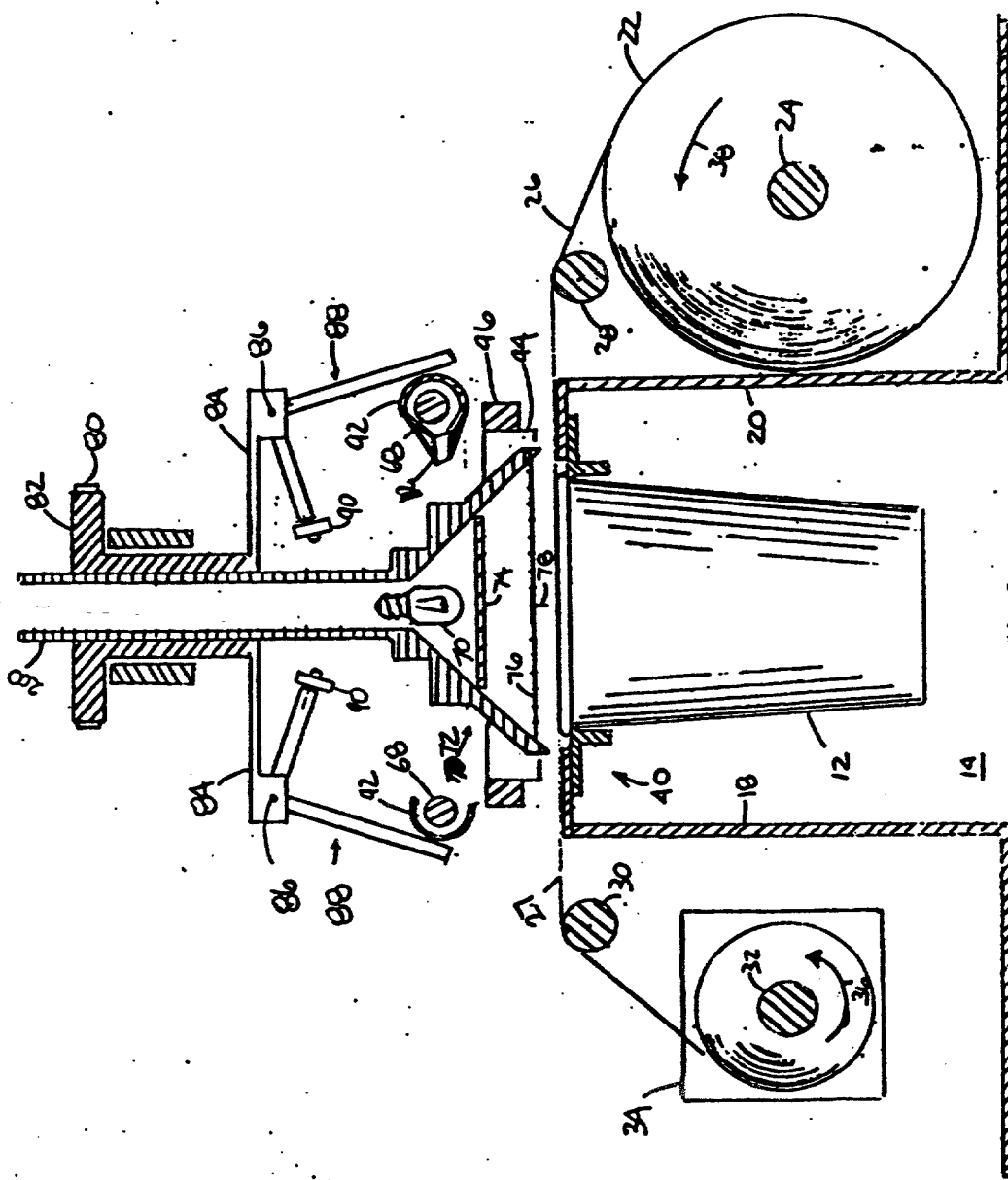
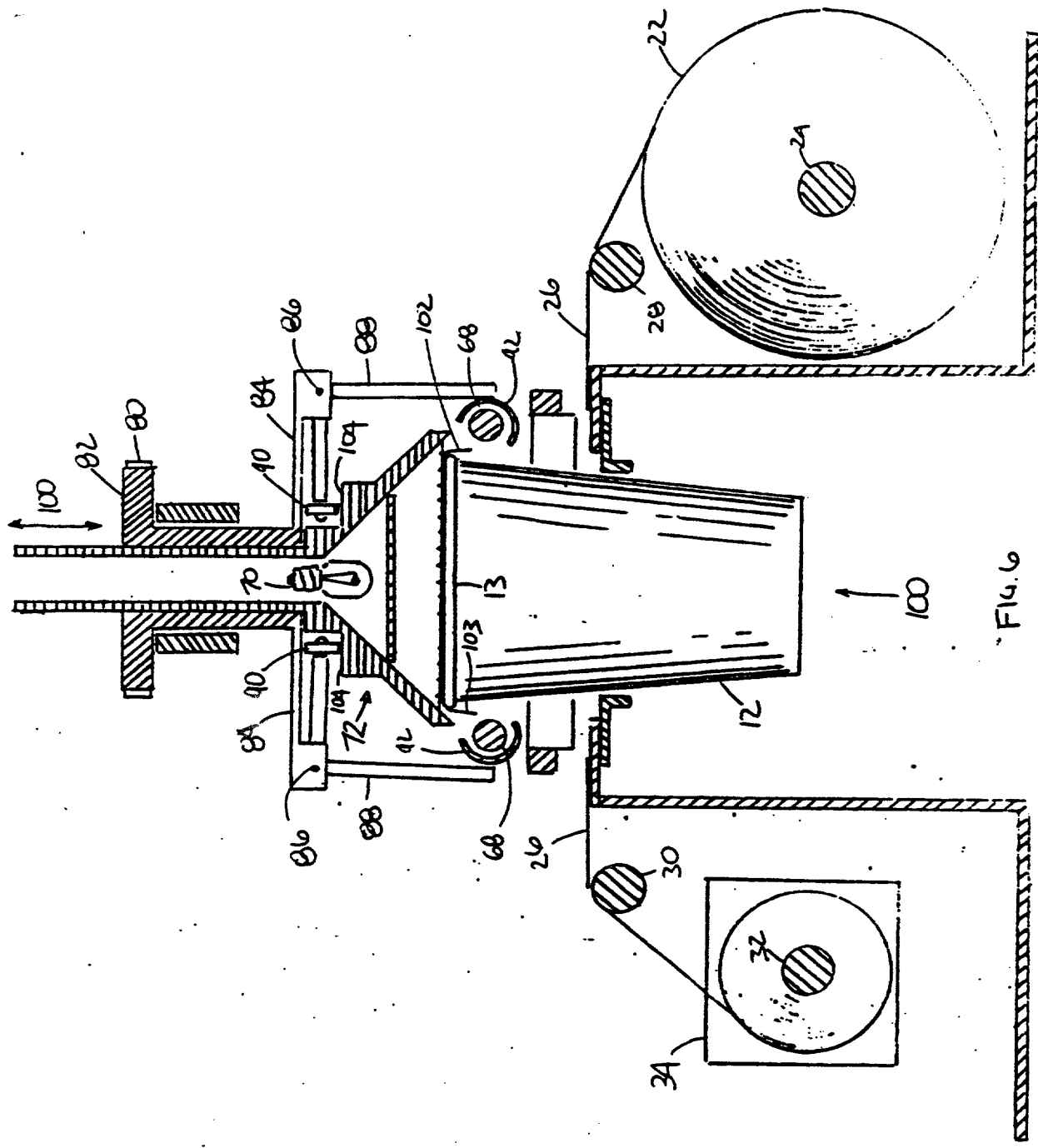


FIG. 4





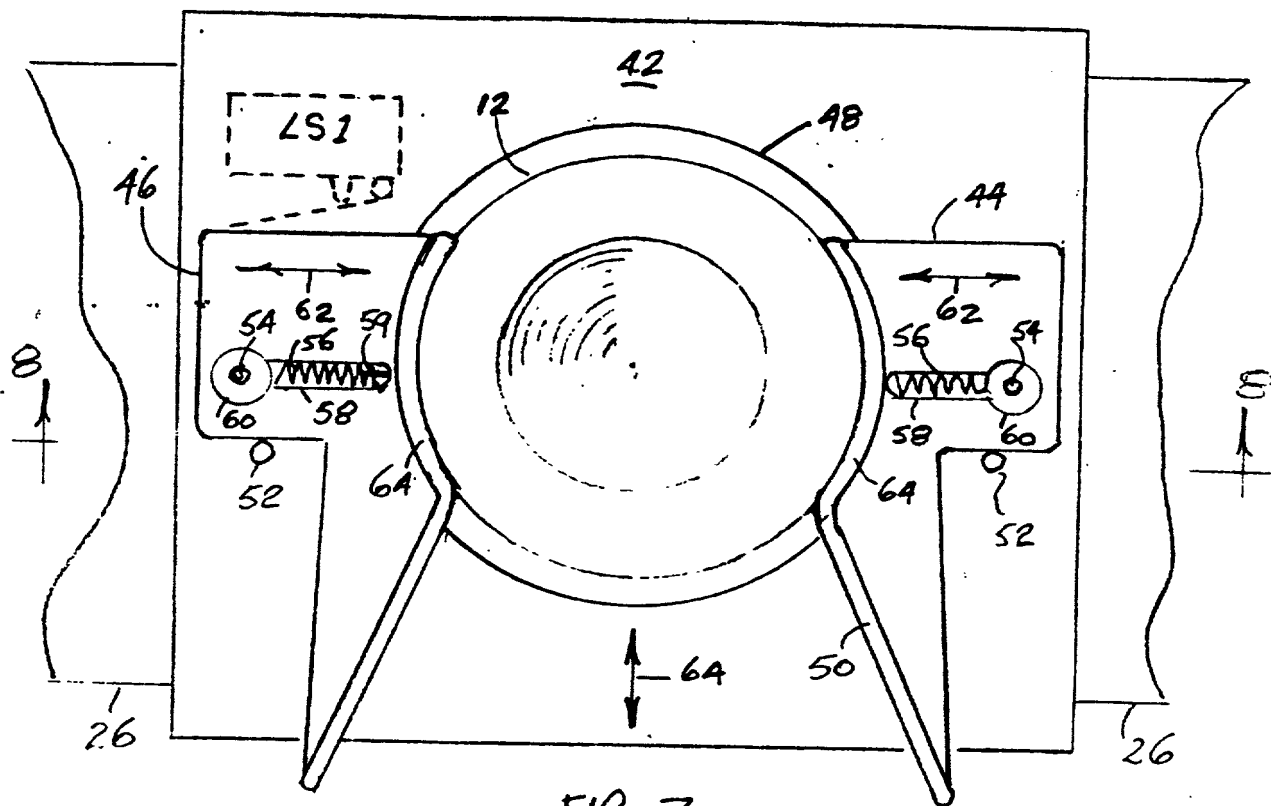


FIG 7

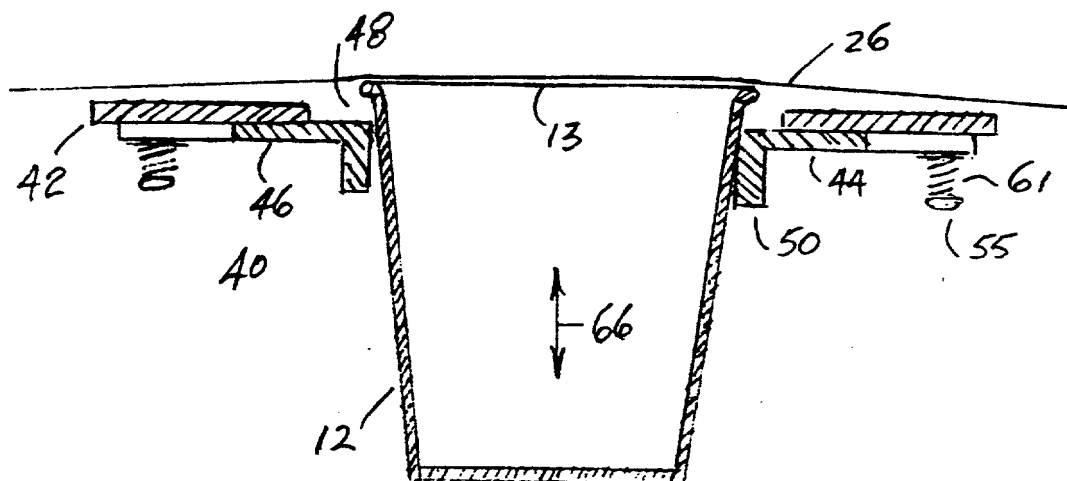


FIG 8

FIG 9

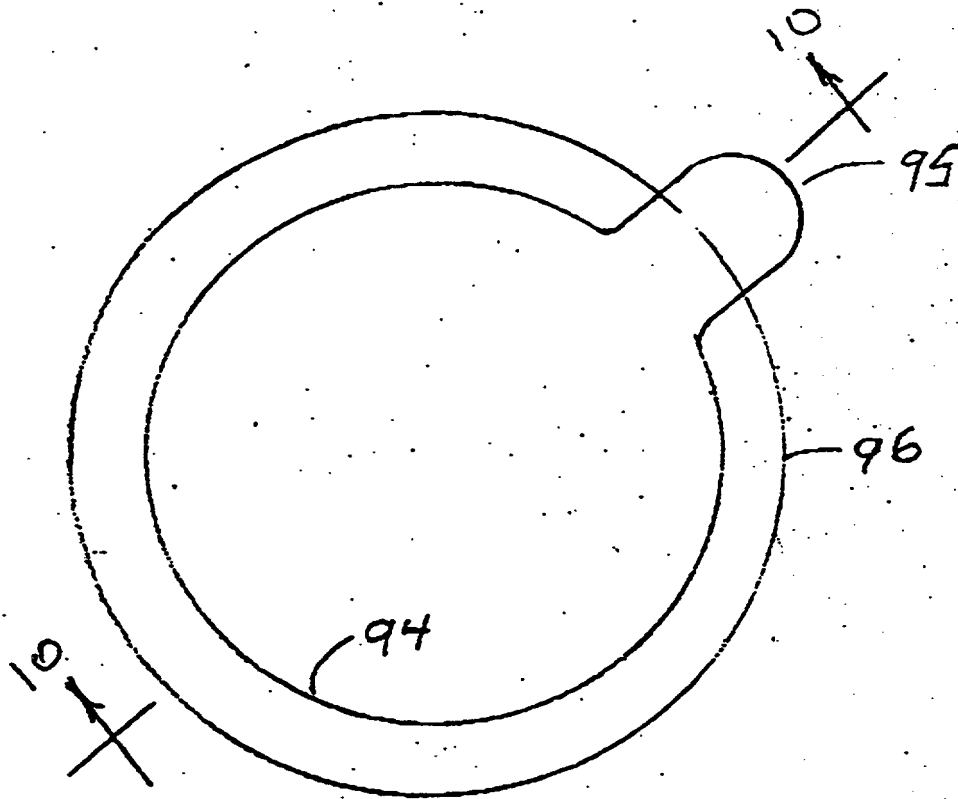
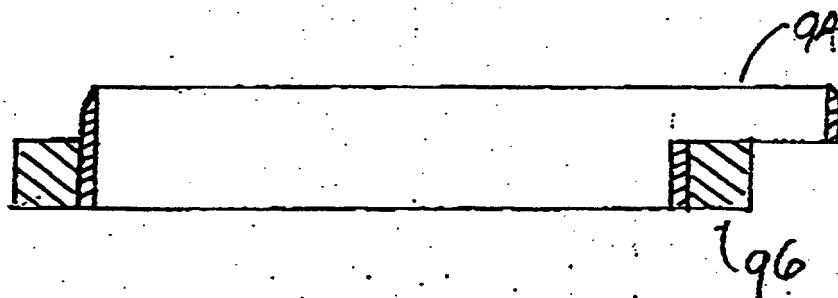


FIG 10



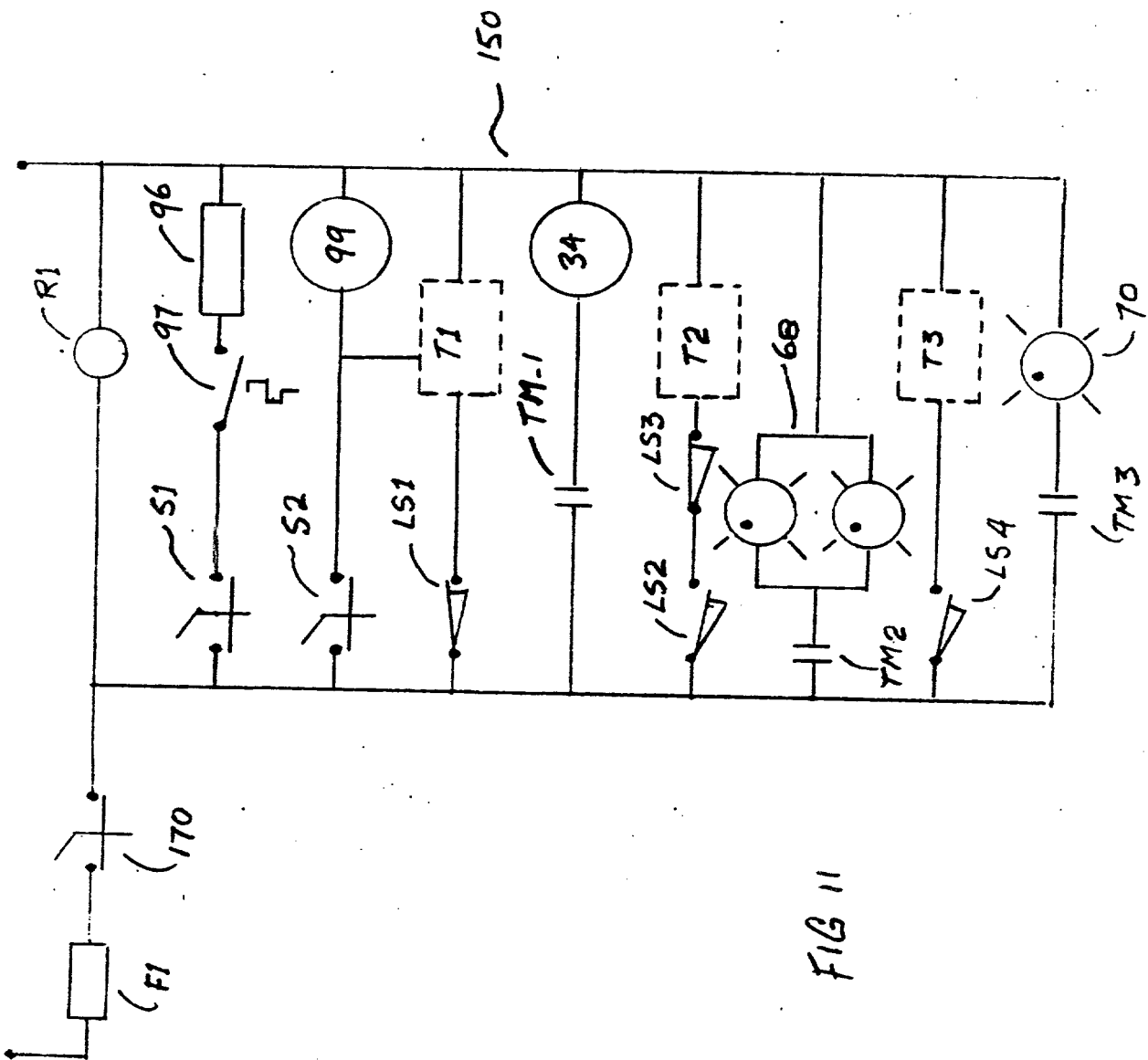


FIG 11

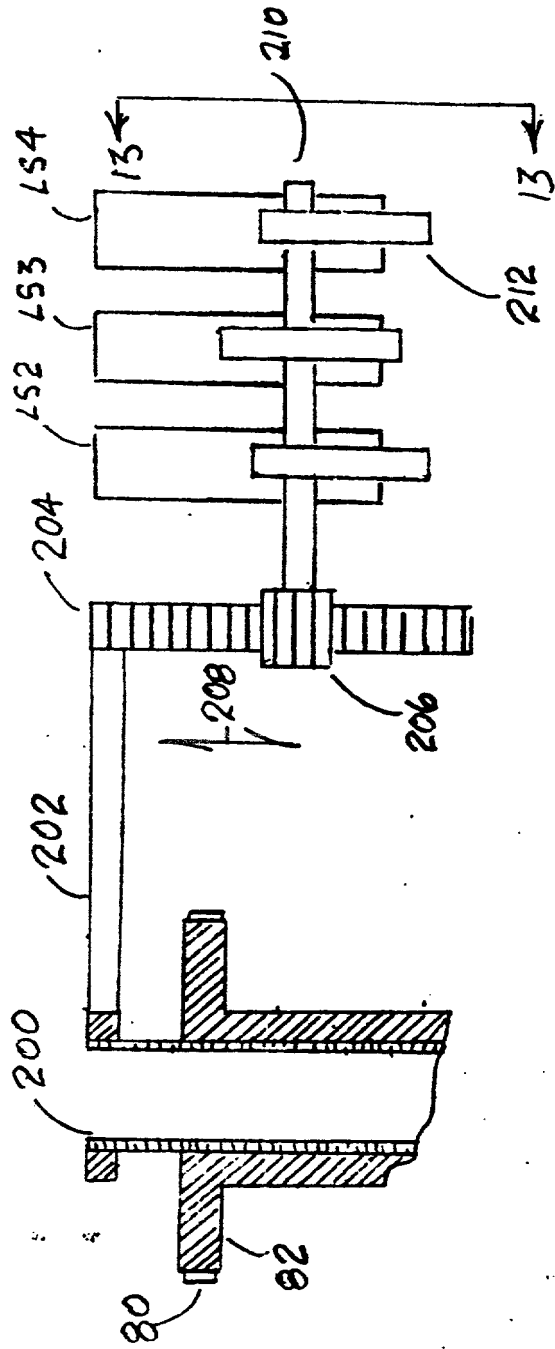


FIG 12

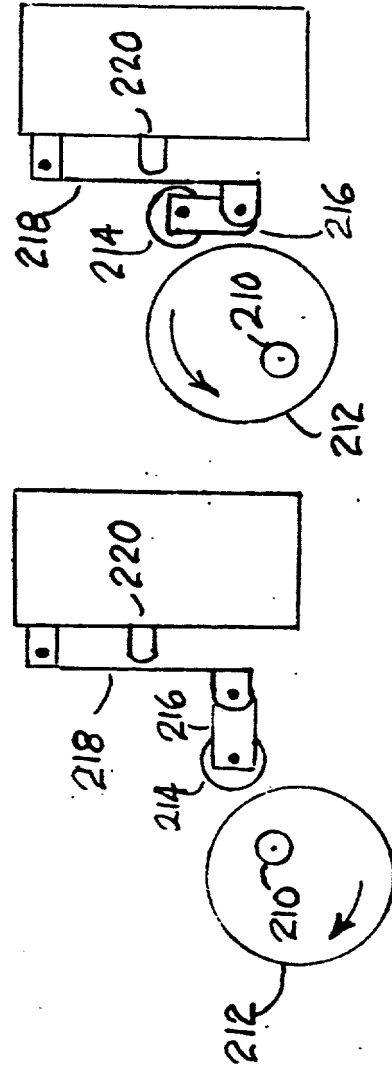


FIG 13A

FIG 13B

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

Residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:
DEVICE FOR HEAT SHRINKING FILM ONTO AN OPEN-TOPPED CONTAINER

the specification of which (check one)

☒ is attached hereto

☐ was filed on _____ as
Application Serial No. _____

I hereby state that I have reviewed and understand the contents of the above identified specifications, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, S1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, S119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed

(Number) _____

(Country) _____

(Day/Month/Year Filed) _____

☐ Yes ☐ No

(Number) _____

(Country) _____

(Day/Month/Year Filed) _____

☐ Yes ☐ No

☐ Additional applications identified on attached sheet.

I hereby claim the benefit under Title 35, United States Code, S120 of any United States Application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code S112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, S1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

Application Serial No. _____

Filing Date _____

Status - Patented, pending, abandoned

Application Serial No. _____

Filing Date _____

Status - Patented, pending, abandoned

☐ Additional applications identified on attached sheet.

I hereby appoint the following attorneys and/or agents to prosecute this application and to transact all business in the Patent and Trademark Office in connection therewith:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME OF SOLE OR FIRST INVENTOR William J. Bakker	INVENTOR'S SIGNATURE <i>William J. Bakker</i>	DATE April 23 1992
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POST OFFICE ADDRESS M3B 1K8, Canada	As above	
FULL NAME OF THIRD JOINT INVENTOR, IF ANY	INVENTOR'S SIGNATURE	DATE
RESIDENCE		CITIZENSHIP
POST OFFICE ADDRESS		

☐ See attached sheet for similar information and signature for additional joint inventors.